

**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
International General Certificate of Secondary Education

**MARK SCHEME for the October/November 2009 question paper  
for the guidance of teachers**

**0654 CO-ORDINATED SCIENCES**

**0654/05**

Paper 5 (Practical Test), maximum raw mark 45

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

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- 1 (a) good quality of drawings ;  
chlorophyll label ;
- (c) leaf **B** and **C** same shape as in part (a) ;  
leaf **A** only one containing starch, correctly labelled ;  
ignore small traces of starch in **B** and **C**  
pattern of starch matches chlorophyll pattern in (a) ; [3]
- (d) (leaf **A** starch present)  
light and carbon dioxide both needed (for photosynthesis) ;  
starch only found where chlorophyll is ;
- leaf **B**  
no photosynthesis because carbon dioxide is absent ;  
do not allow if stated that water also absent
- leaf **C**  
no photosynthesis because light is absent ; [4]
- (e) to remove carbon dioxide ; OWTTE [1]
- (f) (i) to soften the cuticle / kill leaf / allow entry of ethanol ; [1]
- (ii) as a control ; [1]
- (g) destarch the plant ;  
put lightproof paper over leaf ;  
leave for 24 hours in light ;  
do starch test ; [3 max]

[Total: 15]

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- 2 (a) recording the refractive index ;
- (d) 5 suitable drawings ;;  
Give ONE mark if only 4 (2)
- Table  
angles of  $i$  are about  $60^\circ$ ,  $55^\circ$ ,  $40^\circ$ ,  $30^\circ$  and  $20^\circ$  and  $r$  values ;;  
ONE mark if only 4 values (2)
- angles of  $r$  decrease appropriately ; (1) [5]
- (e) Graph  
scale ;  
plotting ;  
suitable curve ; [3]
- (f) correctly read from graph ; [1]
- (g) both sines correct, estimating if necessary ;;  
if clearly not from the table provided do not allow ratio correctly calculated [2]
- (h) suitable comment ; looking for some idea of accuracy of experiment [1]
- (i) if the refractive index is greater, then angles of refraction would be smaller ; or vice versa  
the denser the medium, the greater the ray is bent ; [2]

[Total: 15]

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- 3 (a) accept anything between 0.03 and 0.08 ;
- (c) results for all three ;  
value for **B** is half **A** within 2 drops ;  
value for **C** is half **B** within 2 drops ;  
value for **C** within 2 drops of SV ;
- if **A** is larger than 20, 2 drops becomes 3 drops [4]
- (d) most concentrated is **A** ;  
needs the largest number of drops ; [2]
- (e) brown ppt. ; [1]
- (f) (i) white ppt. ; [1]  
(ii) dirty white, grey or cloudy (ppt. not necessary here as reaction is slow) ; [1]  
(iii) green ppt. ; [1]
- (g) one mark for iron(II) and one for sulfate ;; [2]
- (h) count drops into a measuring cylinder to suitable volume (at least 5 cm<sup>3</sup>) ;  
divide by number of drops ; [2]

[Total: 15]